IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	BEFORE THE EXAMINER:
Christopher et al.	Unassigned
Serial No.: Divisional of USSN 09/408,050	Group Art Unit No.: Unassigned
Filed:	Attorney Docket No.: 98B054-4
For: *Cationic Group-3 Catalyst System*	Baytown, Texas November 29, 2001

BOX PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT UNDER 37 C.F.R. § 1.115

Assistant Commissioner for Patents:

AMENDMENT

In The Specification:

Please amend the specification to read as follows. Marked-up versions of the amended paragraphs are attached in APPENDIX A: "Marked-Up Specification". Please replace the paragraph that begins on page 1 line 8, with the following paragraph:

> --This application is a Divisional of U.S. Application Ser. No. 09/408050, filed on September 29, 1999. Application 09/408050 claims priority from U.S. Provisional Application Ser. No. 60/102,420, filed September 30, 1998.--

In The Claims:

Please amend the claims to read as follows. A marked-up version of the claims is attached in APPENDIX B: "Marked-Up Claims ".

14. (amended once) A process for olefin polymerization comprising contacting, under olefin polymerization conditions, one or more olefin monomers with an activated Group-3 or Lanthanide metal stabilized by

a) a monoanionic bidentate ligand, and

b) two monoanionic ligands,

wherein the bidentate ligand and the metal form a metallocyclic ring comprising at least five atoms.

Please add the following new claims:

17. (New) The process for olefin polymerization of claim 14 wherein the metal comprises scandium or yttrium.

18. (New) The process for olefin polymerization of claim 14 wherein the bidentate ligand has the formula:

$(C_5H_{4-x}R_x)TE$ wherein

a) x is a number from 0 to 4,

b) each R is, independently, a radical selected from

(i) C_1-C_{20} hydrocarbyl radicals,

(ii) C_1-C_{20} substituted hydrocarbyl radicals wherein one or more hydrogen atoms are replaced by a halogen atom, amido, phosphido, alkoxy or aryloxy or other Lewis-acid- or -base-containing radical,

(iii) C_1-C_{20} hydrocarbyl-substituted Group-14 metalloid radicals, or

(iv) halogen radicals,

or $C_5H_{4-x}R_x$ is a cyclopentadienyl ring wherein

a) x is a number from 0 to 4,

b) two adjacent R-groups are joined to form a C_4-C_{20} ring to give a saturated or unsaturated polycyclic cyclopentadienyl ligand;

c) T is a covalent bridging group containing a Group-14 or -15 element;

d) E is a π-donating ligand or JR'_z wherein

(i) J is an element from Group-15 or -16;

(ii) z is 2 when J is a Group-15 element and 1 when J is a Group-16 element;

(iii) each R' is independently a radical selected from

- C_1-C_{20} hydrocarbyl radicals,
- a substituted C_1-C_{20} hydrocarbyl radical wherein one or more hydrogen atoms is replaced by a halogen atom, amido, phosphido, alkoxy or aryloxy or other Lewis-acid- or -base-containing radical or

- C_1-C_{20} hydrocarbyl-substituted, Group-14 metalloid radicals.

19. (New) The process for olefin polymerization of claim 14 wherein the ancillary ligand has the formula:

-NR'=T'-NR'-

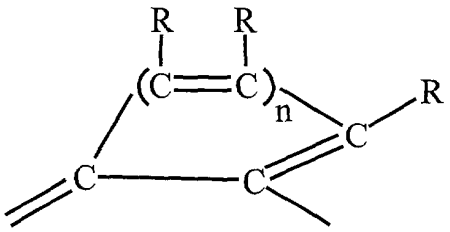
wherein

a) N is nitrogen,

b) T' is a covalent bridging group selected from

$=C(R)[C(R)=C(R)]_n-$

and



wherein each R is, independently, a radical selected from

(i) C_1-C_{20} hydrocarbyl radicals,

(ii) C_1-C_{20} substituted hydrocarbyl radical wherein one or more hydrogen atoms is replaced by a halogen atom, amido, phosphido, alkoxy or aryloxy or other Lewis-acid- or -base-containing radical,

(iii) C_1-C_{20} hydrocarbyl-substituted Group-14 metalloid radicals,

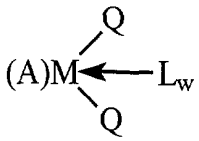
(iv) halogen radicals, or

(v) two adjacent R groups are joined to form a C_4-C_{20} ring, except that R independently may also be hydrogen except for R groups attached to the carbon atoms directly bonded to the nitrogen atoms, and

(vi) n is 1, 2, 3, or 4.

20. (New) A process for olefin polymerization comprising:

a) activating a metal complex to a cationic form, wherein the metal complex comprises a Group-3 or Lanthanide metal complex of the formula



wherein,

(i) M is a Group-3 or Lanthanide metal;

(ii) A is a monoanionic bidentate ancillary ligand which forms a metallocycle with at least 5 primary atoms;

(iii) each Q is independently a monoanionic ligand;

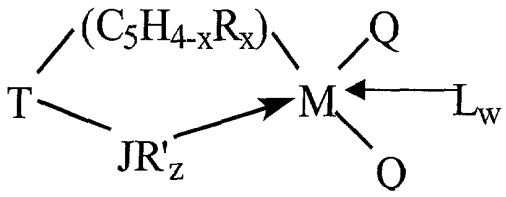
(iv) L is a neutral Lewis base; and

(v) w is a number from 0 to 3;

and

b) contacting one or more olefin monomers with the activated metal complex under olefin polymerization conditions.

21. (New) The process for olefin polymerization of claim 20, wherein the Group-3 or Lanthanide metal complex has the formula



wherein

a) M is a Group-3 or Lanthanide metal;

b) $C_5H_{4-x}R_x$ is a cyclopentadienyl ring covalently π-bound to M and substituted with from zero to four substituent groups R;

c) x is a number from 0 to 4 denoting the degree of substitution of $C_5H_{4-x}R_x$;

d) each R is, independently, a radical selected from C_1-C_{20} hydrocarbyl radicals, C_1-C_{20} substituted hydrocarbyl radicals wherein one or more hydrogen atoms are replaced by a halogen atom, amido, phosphido, alkoxy or aryloxy or other Lewis-acid- or -base-containing radical, C_1-C_{20} hydrocarbyl-substituted metalloid radicals wherein the metalloid is selected from Group-14 elements, and halogen radicals, or $C_5H_{4-x}R_x$ is a cyclopentadienyl ring in which two adjacent R-groups are joined to form a C_4-C_{20} ring to give a saturated or unsaturated polycyclic cyclopentadienyl

ligand which may be additionally substituted with one or more R groups;

e) T is a covalent bridging group containing a Group-14 or -15 element;

f) J is a Group-15 or -16 element;

g) z is 2 when J is a Group-15 element and 1 when J is a Group-16 element;

h) each R' is independently a radical selected from C_1-C_{20} hydrocarbyl radicals, substituted C_1-C_{20} hydrocarbyl radicals wherein one or more hydrogen atoms is replaced by a halogen atom, and C_1-C_{20} hydrocarbyl-substituted metalloid radical wherein the metalloid is selected from Group-14 elements; and

i) each Q is independently a univalent anionic ligand.

22. (New) The process for olefin polymerization of claim 21 wherein M is scandium, yttrium or lanthanum.

23. (New) The process for olefin polymerization of claim 21 wherein T is a dialkyl, alkylaryl or diaryl silicon or germanium radical.

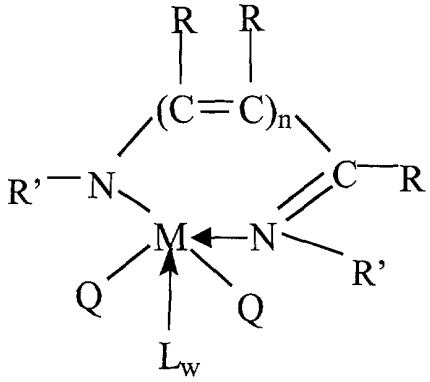
24. (New) The process for olefin polymerization of claim 21 wherein T is alkyl or aryl phosphine or amine radical or a hydrocarbyl radical.

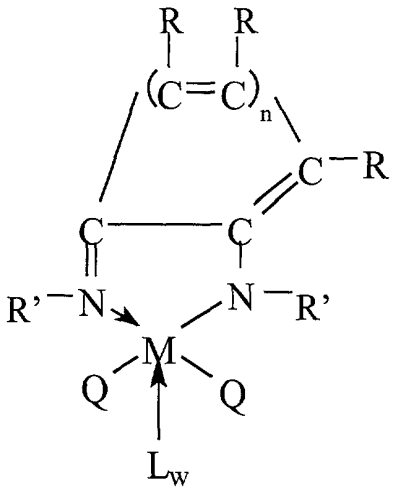
25. (New) The process for olefin polymerization of claim 21 wherein J is oxygen, sulfur, nitrogen or phosphorus.

26. (New) The process for olefin polymerization of claim 21 wherein J is nitrogen.

27. (New) A process for olefin polymerization comprising

a) activating a Group-3 or Lanthanide metal complex to a cationic form wherein the metal complex has one of the formulas:





wherein

(i) M is a Group-3 or Lanthanide metal;

(ii) each R is independently hydrogen, halogen, a C_1-C_{20} hydrocarbyl, or a substituted C_1-C_{20} hydrocarbyl wherein one or more hydrogen atoms is replaced by a halogen atom, amido, phosphido, alkoxy or aryloxy or other Lewis-acid- or -base-containing radical, C_1-C_{20} hydrocarbyl-substituted metalloid radical wherein the metalloid is selected from Group-14 elements, or two adjacent R-groups are joined to form a C_4-C_{20} ring, except that R independently may also be hydrogen except for R groups attached to the carbon atoms directly bonded to the nitrogen atoms;

(iii) n is 1, 2, 3, or 4;

(iv) each Q is independently a monoanionic ligand;

(v) L is a neutral Lewis base; and

(vi) w is a number from 0 to 3;

and

b) contacting one or more olefin monomers with the activated metal complex under olefin polymerization conditions.

28. (New) The complex of claim 27 wherein M is scandium, yttrium, or lanthanum.

Please cancel claims 1–12 and 15–16 without prejudice.

REMARKS

- Claims 13, 14, and 17–28 are pending in this Application.

All claims are believed to be in condition for allowance.

Please contact me if you think doing so will be helpful.

Respectfully submitted,

11/29/01
Date

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APPENDIX A

SPECIFICATION MARKED-UP TO SHOW CHANGES

TITLE : CATIONIC GROUP 3 CATALYST SYSTEM

INVENTORS: Joseph N. Christopher, Kevin R. Squire, Jo Ann M. Canich, Timothy D. Shaffer

RELATED APPLICATIONS

This application claims priority from an earlier filed application 60/102,420, filed September 30, 1998.

FIELD OF THE INVENTION

This invention relates to certain transition metal compounds from Group 3 of the Periodic Table of Elements, and to a catalyst system comprising a Group 3 or Lanthanide transition metal compound and alumoxane, modified alumoxane, non-coordinating anion activator, Lewis acid, or the like to form an active cationic catalyst species for the production of polyolefins such as polyethylene, polypropylene and alpha-olefin copolymers of ethylene and propylene having a high molecular weight.

BACKGROUND OF THE INVENTION

Neutral scandium compounds having two univalent ancillary ligands or a bidentate, divalent ancillary ligand are known from Shapiro et al., Organometallics, vol. 9, pp. 867-869 (1990); Piers et al., J. Am. Chem Soc., vol. 112, pp. 9406-9407 (1990); Shapiro et al., J. Am. Chem Soc., vol. 116, pp. 4623-4640 (1994); Hajela et al., Organometallics, vol. 13, pp. 1147-1154 (1994); and U.S. Patent 5,563,219 to Yasuda et al. Similar yttrium, lanthanum and cerium complexes are disclosed in Booij et al., Journal of Organometallic Chemistry, vol. 364, pp. 79-86 (1989) and Coughlin et al., J. Am. Chem. Soc., vol. 114, pp. 7606-7607 (1992). Similar polymerizations with a metal scandium complex having a bidentate, divalent ancillary ligand using a non-ionizing cocatalyst is known from U.S. Patent 5,464,906 to Patton et al.

Group 3-10 metallocyclic catalyst complexes are described in U.S. Patents 5,312,881 and 5,455,317, both to Marks et al.; U.S. Patent 5,064,802 to Stevens et al.; and EP 0 765 888 A2.

APPENDIX B

CLAIMS MARKED-UP TO SHOW CHANGES

n is 1, 2, 3 or 4;

each Q is independently a monoanionic ligand;

L is a neutral Lewis base; and

w is a number from 0 to 3.

13. The complex of claim 10 wherein M is scandium, yttrium, or lanthanum.

14. A process for olefin polymerization comprising contacting one or more olefin monomers with the catalyst system of any one of the claims 1-4 under olefin polymerization conditions. Scopy in limitation of Claim 13

15. A process for olefin polymerization comprising activating the metal complex of any one of claims 5-11 to a cationic form and contacting one or more olefin monomers therewith under olefin polymerization.

16. A process for olefin polymerization comprising activating the metal complex of any one of claims 12 and 13 to a cationic form and contacting one or more olefin monomers therewith under olefin polymerization.